

## 780 CMR 3620

### COMBUSTION AIR

**3620.1 General:** Combustion air requirements of 780 CMR 3620 are intended to apply only when the requirements of 248 CMR or 527 CMR, as applicable, do not apply.

**3620.1.1 Air supply:** Fuel-burning equipment shall be provided with a supply of air for fuel combustion, draft hood dilution and ventilation of the space in which the equipment is installed. The methods of providing combustion air in this chapter do not apply to direct vent appliances, listed cooking appliances, refrigerators and domestic clothes dryers.

**3620.1.1.1 Buildings of unusually tight construction:** In buildings of unusually tight construction, combustion air shall be obtained from outside the sealed thermal envelope. In buildings of ordinary tightness insofar as infiltration is concerned, all or a portion of the combustion air for fuel-burning appliances may be obtained from infiltration when the room or space has a volume of 50 cubic feet per 1,000 Btu/h (4.83 L/W) input.

**3620.1.2 Exhaust and ventilation system:** Air requirements for operation of exhaust fans, kitchen ventilation systems, clothes dryers, and fireplaces shall be considered in determining the adequacy of a space to provide combustion air.

**3620.1.3 Volume dampers prohibited:** Volume dampers shall not be installed in combustion air openings.

**3620.1.4 Prohibited sources:** Combustion air ducts and openings shall not connect appliance enclosures with space in which the operation of a fan may adversely affect the flow of combustion air. Combustion air shall not be obtained from an area in which flammable vapors present a hazard.

**3620.1.5 Opening area:** The free area of each opening shall be used for determining combustion air. Unless otherwise specified by the manufacturer or determined by actual measurement, the free area shall be considered 75% of the gross area for metal louvers and 25% of the gross area for wood louvers.

**3620.2 All air from inside the building, general:** The requirements of 780 CMR 3620.2.1 through 3620.2.3 shall apply when all combustion air is taken from inside the building.

**Note:** also see 780 CMR 3610, generally, for fireplaces and solid fuel-burning appliances.

**3620.2.1 Required volume:** If the volume of the space in which fuel-burning appliances are installed is greater than 50 cubic feet per 1,000 Btu/h (4.83 L/W) of aggregate input rating in buildings of ordinary tightness insofar as infiltration is concerned, normal infiltration shall be regarded as adequate to provide combustion air. Rooms communicating directly with the space in which the appliances are installed through openings not furnished with doors shall be considered part of the required volume.

**3620.2.2 Confined space:** Where the space in which the appliance is located does not meet the criterion specified in 780 CMR 3620.2.1, two permanent openings to adjacent spaces shall be provided so that the combined volume of all spaces meets the criterion. One opening shall be within 12 inches (305 mm) of the top and one within 12 inches (305 mm) of the bottom of the space, as illustrated in Figure 3620.2.2. Each opening shall have free area equal to a minimum of one square inch per 1,000 Btu/h (2.20 mm<sup>2</sup>/W) input rating of all appliances installed within the space, but not less than 100 square inches (0.064 m<sup>2</sup>).

**3620.2.3 Unusually tight construction:** If the space is of adequate volume in accordance with 780 CMR 3620.2.1 or 3620.2.2, but is within a building sealed so tightly that infiltration air is not adequate for combustion, combustion air shall be obtained from outdoors or from spaces freely communicating with the outdoors in accordance with 780 CMR 3620.3 or 3620.4.

**3620.3 All combustion air from outside the building, general:** The requirements of 780 CMR 3620.3.1 through 3620.3.5 shall apply when all combustion air is taken from outside the building.

**3620.3.1 Outdoor air:** When the space in which fuel-burning appliances are located does not meet the criterion for indoor air specified in 780 CMR 3620.2, outside combustion air shall be supplied through openings or ducts, as illustrated in Figures 3620.3.1, 3620.3.3a, 3620.3.3b and 3620.4. One opening shall be within 12 inches (305 mm) of the top of the enclosure, and one within 12 inches (305 mm) of the bottom of the

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enclosure. Openings are permitted to connect to spaces directly communicating with the outdoors, such as ventilated crawl spaces or ventilated attic spaces. The same duct or opening shall not serve

**3620.3.2 Size of opening:** When communicating with the outdoors by means of vertical ducts, each opening shall have a free area of at least one square inch per 4,000 Btu/h ( $0.550 \text{ mm}^2/\text{W}$ ) of total input rating of all appliances in the space. If horizontal ducts are used, each opening shall have a free area of at least one square inch per 2,000 Btu/h ( $1.10 \text{ mm}^2/\text{W}$ ) of total input of all appliances in the space. Ducts shall be of the same minimum cross-sectional area as the required free area of the openings to which they connect. The minimum cross-sectional dimension of rectangular air ducts shall be three inches (76 mm).

**3620.3.3 Attic combustion air:** Combustion air obtained from an attic area, as illustrated in Figure 3620.3.3a, shall be in accordance with the following:

1. The attic ventilation shall be sufficient to provide the required volume of combustion air.
2. The combustion air opening shall be provided with a metal sleeve extending from the appliance enclosure to at least six inches (153 mm) above the top of the ceiling joists and ceiling insulation.
3. An inlet air duct within an outlet air duct shall be an acceptable means of supplying attic combustion air to an appliance room provided that the inlet duct extends at least 12 inches (305 mm) above the top of the outlet duct in the attic space, as illustrated in Figure 3620.3.3b.
4. The end of ducts that terminate in an attic shall not be screened.

**3620.3.4 Under-floor combustion air:** Combustion air obtained from under-floor areas, as illustrated in Figure 3620.3.4, shall have a free opening area to the outside equivalent to not less than twice the required combustion air opening.

both combustion air openings. The duct serving the upper opening shall be level or extend upward from the appliance space.

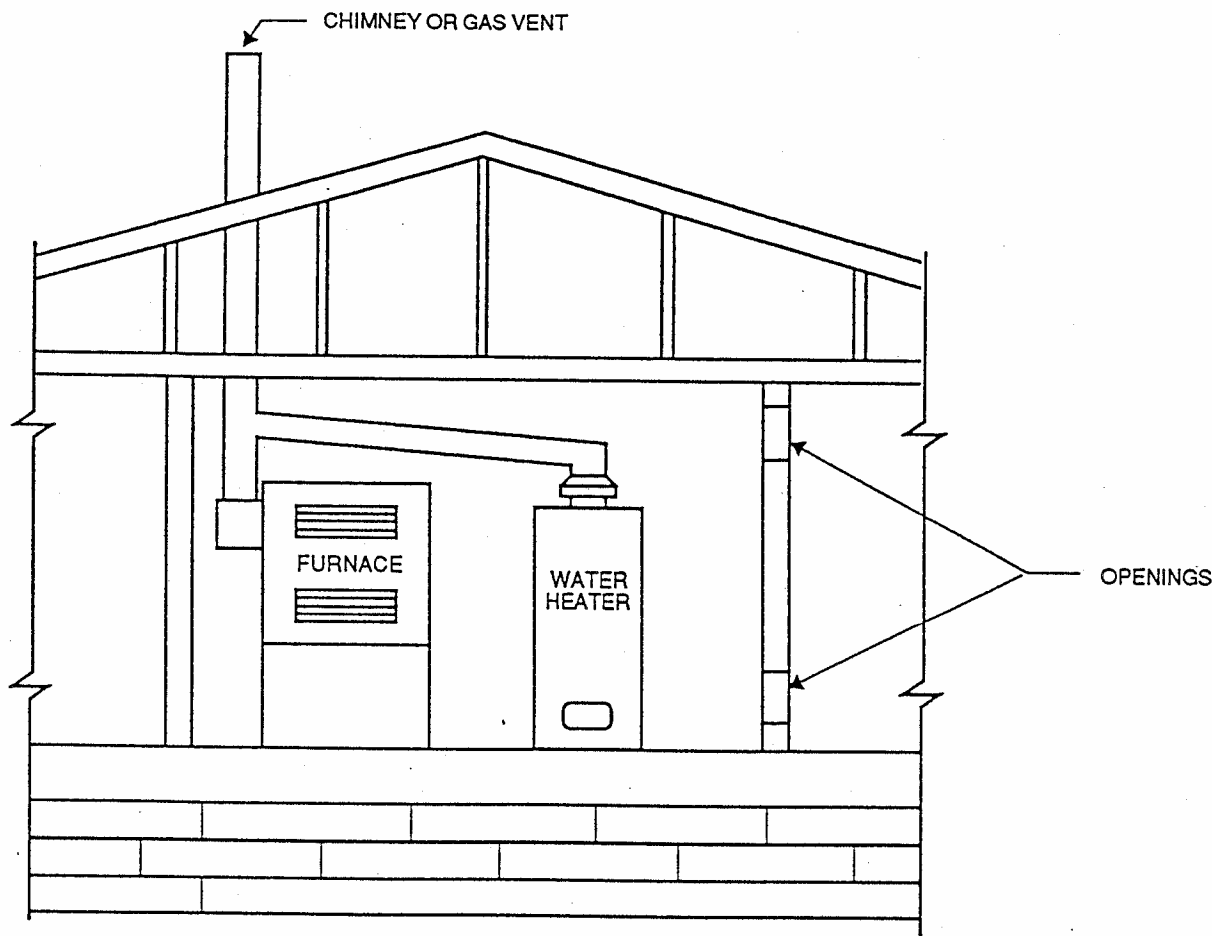
**3620.3.5 Opening requirements:** Outside combustion air openings shall be covered with corrosion-resistant screen or equivalent protection having no less than  $\frac{1}{4}$ -inch (6.4 mm) openings, and not greater than  $\frac{1}{2}$ -inch (12.7 mm) openings.

**3620.4 Combined use of indoor and outdoor air for combustion, general:** The requirements of 780 CMR 3620.4.1 through 3620.4.2 shall apply when required combustion air consists of both indoor and outdoor air.

**3620.4.1 Supply method:** When the space in which fuel-burning appliances are located does not meet the criterion for indoor air specified in 780 CMR 3620.2, combustion air supplied by a combined use of indoor and outdoor air shall be supplied through openings and ducts extending to the appliance room or to the vicinity of the appliance.

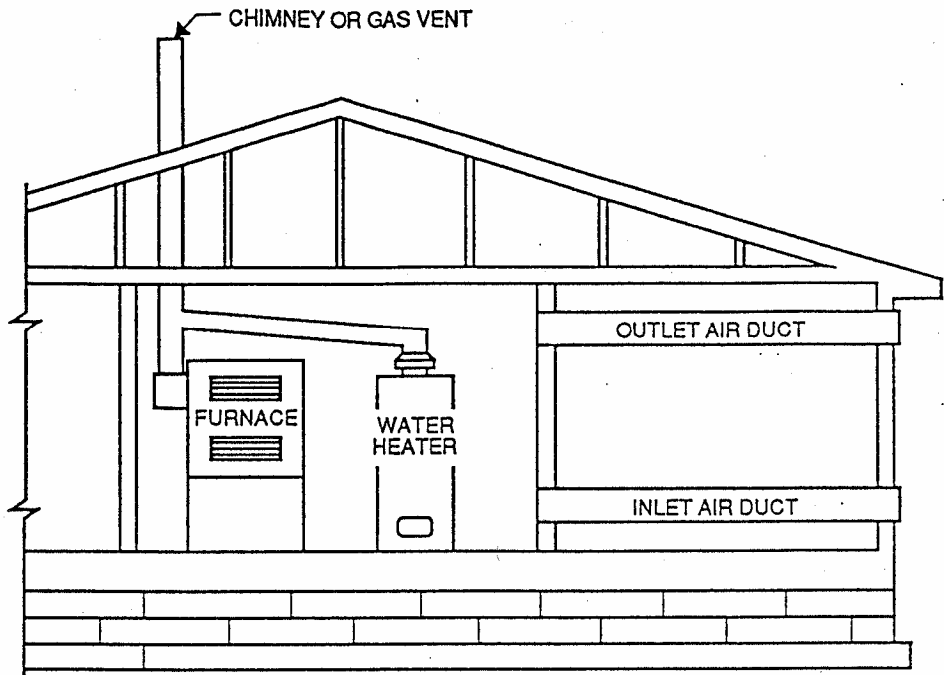
**3620.4.2 Openings and supply ducts:** Two openings for ventilation shall be located and sized in accordance with 780 CMR 3620.2.2. In addition, there shall be one opening directly communicating with the outdoors or to such spaces (crawl space or attic) that freely communicates with the outdoors. This opening shall have free area of at least one square inch per 5,000 Btu/h ( $0.440 \text{ mm}^2/\text{W}$ ) of total input of all appliances in the space. Ducts shall be of the same minimum cross-sectional area as the required free area of the opening. Ducts admitting outdoor air may be connected to the return air side of the heating system.

**Figure 3620.2.2**  
**EQUIPMENT LOCATED IN CONFINED SPACES -**  
**ALL AIR FROM ADJACENT SPACES WITHIN THE BUILDING**



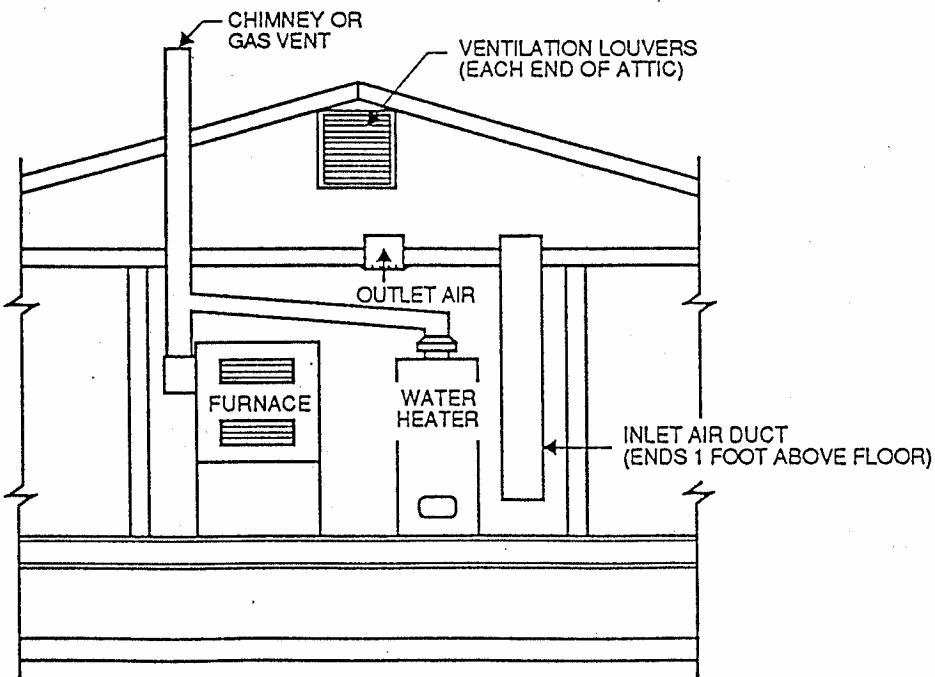
For SI: 1 square inch = 645.16 mm<sup>2</sup>, 1 Btu/h = 0.2931 W.  
**NOTE:** Each opening shall have a free area of not less than one square inch per 1,000 Btu/h of the total input rating of all equipment in the enclosure, but not less than 100 square inches.

**Figure 3620.3.1**  
**EQUIPMENT LOCATED IN CONFINED SPACES -**  
**ALL AIR TAKEN FROM OUTDOORS**



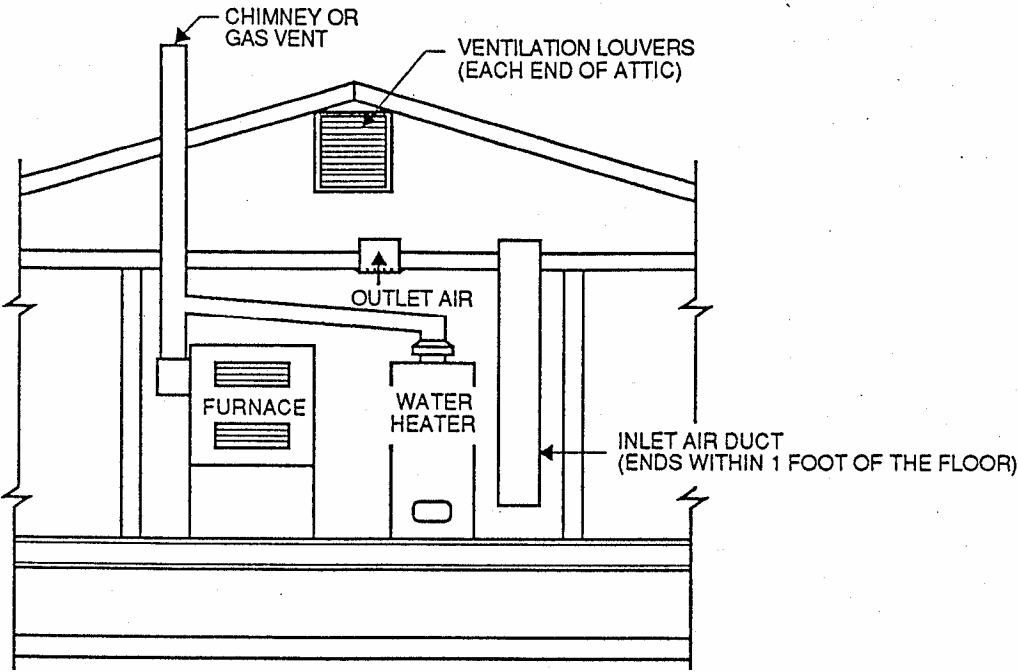
For SI: 1 Btu/h = 0.2931 W.  
**NOTES:** Each air duct opening shall have a free area of not less than one square inch per 2,000 Btu/h of the total input rating of all equipment in the enclosure.

**FIGURE 3620.3.3a**  
**EQUIPMENT LOCATED IN CONFINED SPACES -**  
**ALL AIR FROM OUTDOORS THROUGH VENTILATED ATTIC**



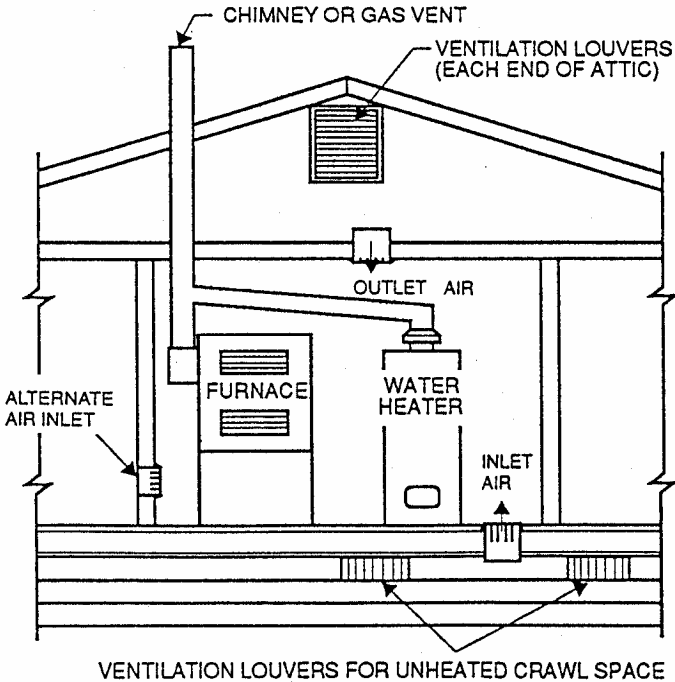
For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm<sup>2</sup>, 1 Btu/h = 0.2931 W.  
**NOTE:** The inlet and outlet air openings shall each have a free area of not less than one square inch per 4,000 Btu/h of the total input rating of all equipment in the enclosure.

**Figure 3620.3.3b**  
**EQUIPMENT LOCATED IN CONFINED SPACES -**  
**ALL AIR FROM OUTDOORS THROUGH VENTILATED ATTIC**  
(Alternative Method)



For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm<sup>2</sup>, 1 Btu/h = 0.2931 W.  
**NOTE:** The inlet and outlet air openings shall each have a free area of not less than one square inch per 4,000 Btu/h of the total input of all equipment in the enclosure.

**Figure 3620.4**  
**EQUIPMENT LOCATED IN CONFINED SPACES -**  
**INLET AIR FROM VENTILATED CRAWL SPACE AND OUTLET AIR**  
**TO VENTILATED ATTIC**



For SI: 1 square inch = 645.16 mm<sup>2</sup>, 1 Btu/h = 0.2931 W.  
**NOTE:** The inlet and outlet air openings shall each have a free area of not less than one square inch per 4,000 Btu/h of the total input of all equipment in the enclosure.

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